

A Low-Sidelobe Frequency-Scan Millimeter-Wave Antenna for Cloud and Precipitation Sensing, Phase I

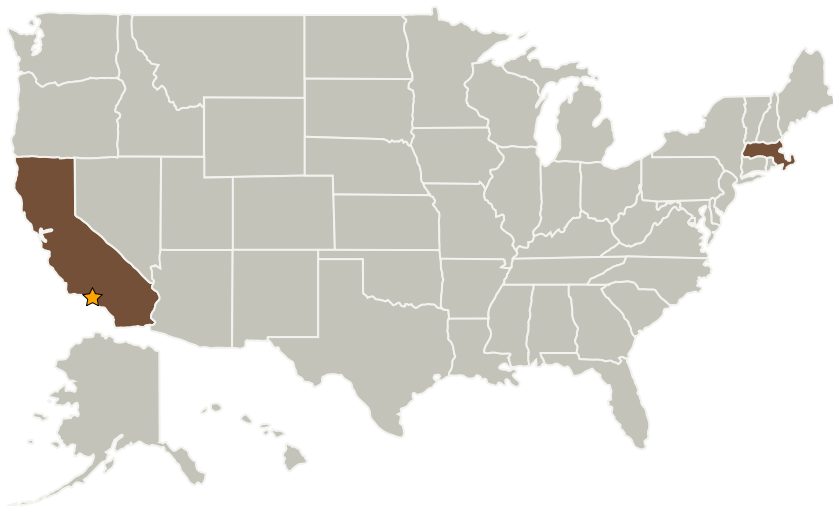
Completed Technology Project (2005 - 2005)



Project Introduction

NASA is committed to measuring clouds on a global scale and will soon launch CloudSat, which will carry the first space borne cloud-profiling radar (CPR). Operating at 94 GHz, the CPR will conduct a 2 year global survey of cloud properties, collecting quantitative information on cloud-layer thickness, base and top altitudes, cloud optical thickness, and cloud water and ice contents. A follow-on mission is envisioned that will fly a low-mass cross-track scanning antenna. This will provide future missions with much improved spatial coverage for comparison with numeric models and reduced time between subsequent measurements over the same region. This proposed Phase I effort will investigate the required innovations to design and build a novel airborne prototype W-band (94 GHz) cross-track scanning antenna and wideband radar system. The proposed antenna will utilize a low-mass offset reflector and a frequency-scanned line-feed to achieve for the first time at W-band a cross track scan width of approximately 60 degrees. This design will lead to a prototype scanning radar system that can be flown on high-altitude platforms such as the NASA ER-2, WB-57 and Proteus. The prototype antenna will be compatible with existing space-qualified transmitters and can be scaled for space flight.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Remote Sensing Solutions, Inc.	Supporting Organization	Industry	Barnstable, Massachusetts

Primary U.S. Work Locations

California	Massachusetts
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

James R Carswell

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves